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09/701,658	11/30/2000	Carsten Bingel	732/980(26	5708

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EXAMINER

LEE, RIP A

ART UNIT	PAPER NUMBER
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1713

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14

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Paper No. 14

Application Number: 09/701,658  
Filing Date: November 30, 2000  
Appellant(s): BINGEL, ET AL.

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Edward J. Smith  
For Appellant

**MAILED**  
**JUN 18 2003**  
**GROUP 1700**

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed April 11, 2003.

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**(1) *Real Party in Interest***

A statement identifying the real party in interest is contained in the brief.

**(2) *Related Appeals and Interferences***

The brief does not contain a statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief. Therefore, it is presumed that there are none. The Board, however, may exercise its discretion to require an explicit statement as to the existence of any related appeals and interferences.

**(3) *Status of Claims***

The statement of the status of the claims contained in the brief is correct.

**(4) *Status of Amendments After Final***

The two amendments after final rejection filed on January 7, 2003 and on April 11 have not been entered.

**(5) *Summary of Invention***

The invention is directed to bridged metallocene monohalide complexes having at least one indenyl ring attached to the bridging group where the metallocenes have certain oxygen or sulfur to carbon moieties attached to the transition metal. The oxygen and sulfur to carbon moieties are defined in claims 9 and 12 by "Y" and "R."

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**(6) Issues**

The appellant's statement of the issues in the brief is substantially correct. The changes are as follows: Claims 9-14 remains unpatentable over Tsutsui *et al.* Also, the subject matter of claims 9-14 remains unpatentable over Tsutsui *et al.* in view of Repo *et al.* Neither of the rejections has been withdrawn. The reference to 35 U.S.C. 102(b) in the Advisory Action is a typographical error. As documented in Paper No. 7, the rejection of record is based on 35 U.S.C. 103(a).

**(7) Grouping of Claims**

Appellant's brief includes a statement that claims 11 and 12 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

**(8) Claims Appealed**

A substantially correct copy of appealed claim 12 appear on page 13 of the Appendix to the appellant's brief. The minor errors are as follows: The recitation "C<sub>2</sub>-C<sub>10</sub>-alkenyl," previously written as "C<sub>2</sub>-C<sub>25</sub>-alkenyl," on line 8 of the claim was corrected in the April 11 response, but this amendment has not been entered formally.

The copy of the appealed claims 9-11, 13, and 14, contained in the Appendix to the brief, is correct. The amendment to claim 9, which addresses appropriately the claim objection set forth in Paper No. 7, has not been entered to date.

**(9) Prior Art of Record**

5,795,838

Tsutsui et al.

08-1998

Repo, T., et al. Journal of Organometallic Chemistry 1997, 541, 363-366.

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**(10) Grounds of Rejection**

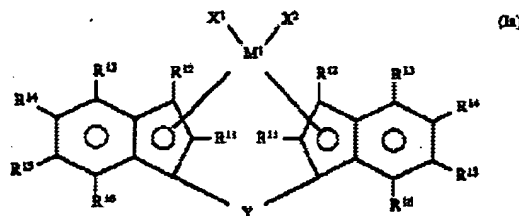
The following ground(s) of rejection are applicable to the appealed claims:

(A) Claims 9-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,795,838 to Tsutsui *et al.*

(i) Present claim 9 is drawn to a bridged, monohalide metallocene complex containing a group 3-6 metal and at least one indenyl ligand in the  $\pi$ -ligand set. The metallocene also possesses an oxygen or sulfur-containing ancillary ligand defined as Y-R<sup>3</sup> wherein R<sup>3</sup> represents C<sub>2</sub>-C<sub>25</sub>-alkenyl, C<sub>3</sub>-C<sub>15</sub>-alkylalkenyl, C<sub>5</sub>-C<sub>24</sub>-heteroaryl, C<sub>7</sub>-C<sub>30</sub>-arylalkyl, C<sub>7</sub>-C<sub>30</sub>-alkylaryl, fluorinated C<sub>1</sub>-C<sub>25</sub>-alkyl, fluorinated C<sub>6</sub>-C<sub>24</sub>-aryl, fluorinated C<sub>7</sub>-C<sub>30</sub>-arylalkyl, or fluorinated C<sub>7</sub>-C<sub>30</sub>-alkylaryl.

Present claim 11 is drawn to a bridged, monohalide *bisindenyl* metallocene complex containing a group 4 metal. The metallocene also possesses an oxygen or sulfur-containing ancillary ligand defined as Y-R<sup>3</sup> wherein R<sup>3</sup> represents isopropyl, *tert*-butyl, cyclohexyl, octyl, C<sub>5</sub>-C<sub>24</sub>-heteroaryl, C<sub>7</sub>-C<sub>30</sub>-arylalkyl, C<sub>7</sub>-C<sub>30</sub>-arylalkyl, fluorinated C<sub>6</sub>-C<sub>24</sub>-aryl, fluorinated C<sub>7</sub>-C<sub>30</sub>-arylalkyl, or fluorinated C<sub>7</sub>-C<sub>30</sub>-alkylaryl.

(ii) Claim 14 of Tsutsui *et al.* discloses all the essential limitations of claims 9 and 11, as shown in general formula (Ia), reproduced for convenience below.



First, it is apparent that the compound contains the requisite bridged, *bis*(indenyl) ligand set and group 4 transition metal of claim 11, and therefore, it also meets the broader, corresponding structural features set forth in claim 9. Secondly, with respect to the ancillary ligands, the reference indicates that  $X^1$  and  $X^2$  are each, *i.e.*, they may be the same or different from each other, a hydrocarbon group, an oxygen-containing group, a sulfur-containing group, a hydrogen atom, or a halogen atom (col. 57, lines 40-43). Thirdly, reading further through claim 14 of Tsutsui *et al.*, it can be seen in the definition of structure (Ic), a more refined aspect of the claim, that the term "oxygen-containing group" includes an aryloxy group of 6-10 carbon atoms (col. 58, line 40).

An aryloxy group of 6-10 carbon atoms more than adequately satisfies the embodiments of the present claims in which Y represents O or S, and  $R^3$  is a  $C_7$ - $C_{30}$ -arylalkyl or  $C_7$ - $C_{30}$ -alkylaryl.

Tsutsui *et al.* does not show specific examples of metallocenes in which  $X^1$  is a halogen and  $X^2$  as an oxygen-containing, aryloxy group of 6-10 carbon atoms. However, it would be obvious to one having ordinary skill in the art to derive such a compound because Tsutsui *et al.* clearly states that  $X^1$  and  $X^2$  may be different from each other and because the reference adequately discloses use of both types of ligands. Moreover, compounds of type  $Cp_2M(X)(OR)$  are shown in col. 10, lines 48, 49, and 56. Monohalogen hydrocarbyloxy complexes are not outside the realm of compounds described in the reference, nor are they beyond the grasp of the skilled artisan who has read and has understood the prior art. Therefore, it would be obvious to one having ordinary skill in the art to arrive at the subject matter of the present claims.

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The subject matter of the remaining claims is also obvious from the teachings of the reference. Tsutsui *et al.* teaches the polymerization of olefins in the presence of a catalyst comprised of a combination of inventive compounds with a suitable activator.

(B) Claims 9-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsutsui *et al.* in view of Repo *et al.* (*J. Organomet. Chem.*, 1997).

Repo *et al.* is invoked to elucidate the identity of an aryloxy group of 6-10 carbon atoms, as recited in Tsutsui *et al.* The inventors teach the synthesis of monohalide zirconocene compounds containing 2,6-di-*t*-butylphenoxy and 2,6-diisopropylphenoxy ligands and their use as olefin polymerization catalyst components. These aryloxy ligands are well-known and routinely used in the art, and their precursors are commercially available. Repo *et al.* clearly provides good working examples. One having ordinary skill in the art would have found it obvious to use the aryloxy groups disclosed in Repo *et al.* to make the compounds of the present claims, and one would have expected these compounds to be useful in a polymerization catalyst.

(C) Regarding the factual details set forth in the rejection, the Applicants primary argument hinges upon the fact that Tsutsui *et al.* discloses a broad class of metallocenes, and from this, there is no suggestion to a person of ordinary skill in the art to modify the compounds of the prior art by selecting specific bridged-indenyl metallocene monohalides in order to (*i.e.* for the express purpose of) obtain metallocenes having greater solubility.

It is in a later response that Applicants declare the claimed compounds having greater solubility than their corresponding dihalide compounds is unexpected. Furthermore, Applicants

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submit that the claimed compounds are at least as polymerization active as their dihalide counterparts and may be more so.

It is maintained that the results of the solubility tests of the compounds shown in the specifications are not unexpected, and they are not surprising. Applicants rebuttal that "merely modifying a compound obviously does not inherently make it more soluble" is noted. While this is true, the statement detracts and ignores the rationale proffered by the examiner. Taking Examples 1/1a for discussion purposes, it is not surprising that aryloxy compound 1 is more soluble than dichloride 1a because the aryloxy substituent possesses two branched aliphatic *t*-butyl groups. One having ordinary skill in the art would expect such a structural feature to render the compound more soluble in an aromatic solvent based on the principle of "like dissolves like."

While Applicants cite *In re Grose* purporting that evidentiary basis for support of a rejection under 35 U.S.C 103(a) has not been provided, it is clear that evidentiary basis has been furnished: U.S. Patent No. 5,795,838 to Tsutsui *et al.* Examiner's reliance on scientific principle is used merely to evaluate the data presented by applicants.

Finally, the cited values of activity of 4600 g/g catalyst/hr and 5300 g/g catalyst/hr (page 6 of Applicant's Brief) are comparable. Catalyst activity is typically reported in units of kg/g catalyst /hr, and this is the industrial convention. Converting, the values are 4.6 kg/g catalyst /hr and 5.3 kg/g catalyst/hr, respectively. On a kilogram basis, then, the activities are not significantly different. The examiner acknowledges that obtaining values of catalyst activity is strictly empirical. Catalyst activity, *ipso facto*, is unpredictable. However, this does not mean that catalyst values are necessarily surprising or unexpected.

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(D) Applicants also submit that Repo *et al.* teaches away from use of compounds of the claimed invention because polymerization runs showed that aryloxy-containing metallocenes were less active than their dihalide counterparts.

The Examiner maintains the position that Repo *et al.* does not teach away from use of compounds of the claimed invention. A reference may be said to teach away when a person of ordinary skill in the art, upon reading the reference, would be discouraged from following the path set out in the reference. *Tec Air, Inc. v. Denso Manufacturing Michigan* 192 F.2d 1353, 1360, 52 USPQ 129 (Fed. Cir. 1999). As such, there is no passage in Repo *et al.* which would discourage the skilled artisan from using aryloxy-containing metallocenes in general.

If the reference does teach anything, it teaches the unpredictability in polymerization activity even with these so-called, "well defined," metallocene catalysts. Indeed, while compounds 2 and 3 display slightly lower activity than their corresponding dichloride counterparts at 2 bar, 30 °C, the monochloride aryloxy compound 1 exhibits greater activity than its dichloride analogue at 10 bar, 80 °C (Repo *et al.*, Table 2). Based on this finding, one would actually be encouraged to use aryloxy-containing metallocenes at elevated pressure and temperature.

As explained on page 365 of the journal article, this higher activity is caused by the higher solubility (!) of the complex to the polymerization compared with the corresponding dichloride analogue.

(E) In conclusion, the data of record is insufficient to rebut a *prima facie* case of obviousness. First, one having ordinary skill in the art would find it obvious to arrive at the subject matter of the present claims because such embodiments are encompassed in the teachings of the prior art.

That the reference discloses specific monohalide hydrocarbyloxy complexes renders the notion of such compounds obvious in the face of the general claims of Tsutsui *et al.* Secondly, the solubility of metallocenes bearing C<sub>6</sub>-C<sub>10</sub>-aryloxy ligands is expected to be greater than that of the corresponding dichloride analogues. Lastly, with respect to polymerization activity, the skilled artisan can not extrapolate the data of a few, limited examples to all metallocenes described in the present claims. Even the Applicants concede, "the claimed compounds are at least as polymerization active as their dihalide counterparts and may be more so."

Moreover, the data illustrate polymerization using *bisindenyl* monochloride aryloxy metallocenes only, but it says nothing regarding the polymerization activity of, for instance, *akenyl* complexes and *akylalkenyl* complexes, much less their fluorinated derivatives. Furthermore, there is no showing of data for the claimed series of thiolate complexes (Y = S). Even for the limited set of aryloxy compounds, Repo *et al.* show that different polymerization results arise simply by altering reaction conditions. Therefore, the specification results are not commensurate in scope with the claims in which the data is offered to support. *In re Dill* 202 USPQ 805.

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For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted



Rip A. Lee  
Examiner  
Art Unit 1713



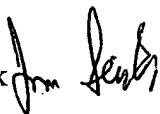
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